

## Information

# Shigellosis in Adults

## Diagnostic Difficulties and Delays

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DIARRHEA IN ADULTS is so common<sup>1</sup> and so often self-limited that physicians frequently elect to manage the problem symptomatically. When they do choose to seek an infectious cause, their efforts are usually unsuccessful because *Salmonella* and, particularly, *Shigella* infections of otherwise healthy adults in the United States are uncommon (fewer than 9 per 100,000 per year)<sup>2</sup> and other agents responsible for diarrhea, such as enteropathogenic *Escherichia coli* and several viruses,<sup>3</sup> are not identified by the standard laboratory tests for enteric pathogens. Diarrhea occurring in certain circumstances, however, should arouse suspicion of a bacterial cause, particularly *Shigella*. These include travel to underdeveloped countries, exposure to facilities where good hygiene is difficult to maintain (such as institutions for the mentally retarded or day-care nurseries), close contact with a recognized case or use of a nonchlorinated, semipublic water system. When these clues are either absent or not elicited, shigellosis is often not considered early as a diagnostic possibility.

The recent recognition of a cluster of three adult patients with shigellosis at our hospital led both our nurse epidemiologist and clinical microbiology staff to bring the cases to our attention. With the public health department, we conducted an epidemiologic investigation which disclosed a previously unrecognized common exposure for two of the cases, but no evidence of a continuing common source epidemic.

Examination of the patients and review of their records showed some of the problems that may arise when this diagnosis is delayed.

### CASE 1. A 21-year-old previously healthy

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woman was admitted on February 20 with the chief complaint of cramping abdominal pain. For two days before admission the pain had been accompanied by nausea, vomiting, watery brown diarrhea, chills and fever as high as 40.5°C (104.9°F). The patient acknowledged orthostatic light-headedness and reported taking a single dose of paregoric without benefit. On physical examination temperature was 37.7°C (99.9°F); pulse, 120 per minute, and blood pressure, 80/50 mm of mercury without postural change. The abdomen had active bowel sounds and was slightly tender without localization or rebound tenderness. Stool guaiac test was negative. Leukocyte count was 2,800 with 13 percent bands, 47 percent polymorphonuclear cells, 37 percent lymphocytes, 2 percent monocytes and 1 percent eosinophils. Serum electrolytes were normal with the exception of the serum sodium which was 129 mEq per liter. The provisional diagnosis was viral gastroenteritis, and fluid and electrolyte replacement was begun. A stool sample was sent for bacterial culture.

On the third hospital day a Gram stain of stool showed one to three leukocytes per high-power field. Although results of the first culture were negative for enteric pathogens, another stool specimen was sent for culture on this day. On the fourth hospital day a stool guaiac test was trace positive. On the fifth hospital day, the laboratory reported that the second stool specimen was positive for *Shigella flexneri*. The patient was then treated with ampicillin, given intravenously and, later, orally in a dosage of 500 mg every six hours for five days. The diarrhea, nausea and vomiting resolved and the patient was discharged on the seventh hospital day.

CASE 2. A 48-year-old woman, the wife of a physician, was admitted on February 21, with a five-day history of fever, diarrhea and abdominal pain. Her illness began with acute onset of chills, fever, vomiting, and watery "red-brown" diarrhea. Because of an episode of near syncope, her husband administered fluids intravenously at home. Three days before admission the patient's husband began treating her with a medication combining diphenoxylate hydrochloride with atropine sulfate (Lomotil, Colonil) and the following day, when little improvement was noted, he obtained a stool specimen for culture and started ampicillin administration.

On admission, the patient had a temperature of

39.8°C (103.6°F), pulse of 80 per minute, and blood pressure of 104/60 mm of mercury without postural change. Abdominal examination showed only diffuse tenderness without rebound. Stool was guaiac positive. The leukocyte count was 4,000 with 34 percent bands, 36 percent polymorphonuclear cells, 23 percent lymphocytes and 6 percent monocytes. The hematocrit reading was 32 percent, but not greatly different from a result obtained before her illness. The results of stool culture, available on the day of admission, showed *Shigella flexneri*. The patient was treated with ampicillin, 1 gram given orally every six hours for five days. Fever rapidly resolved, there was gradual improvement of diarrhea and the patient was discharged on the fifth hospital day.

**CASE 3.** An 80-year-old man was admitted to hospital on February 19 because of a three-day history of fever, chills, difficulty with balance, and somnolence. His wife stated that he was also having unusually frequent bowel movements. Past medical history included chronic obstructive lung disease and asthma. On physical examination temperature was 39°C (102.2°F); pulse, 92 per minute; blood pressure, 100/70 mm of mercury supine and 85/65 mm of mercury sitting. Positive findings were limited to the abdomen: there was a pulsatile mass 8 to 10 cm wide in the midline. The patient was incontinent of stool which was of loose consistency and guaiac positive. Pertinent laboratory data included a hematocrit reading of 55.5 percent and a leukocyte count of 11,700 with 23 percent bands, 62 percent polymorphonuclear cells and 15 percent lymphocytes. The blood urea nitrogen was 44 and serum creatinine was 1.5 mg per dl. The results of the lumbar puncture were normal. A stool specimen was sent for culture.

Because of the prominent aortic aneurysm and because the patient (from whom it was difficult to get a good history) gave little emphasis to his symptom of diarrhea, the diagnosis given major consideration was dissecting aortic aneurysm with intestinal ischemia and bacteremia. Nafcillin and gentamicin therapy was instituted. Ultrasonography and angiography confirmed the presence of an 11 by 16 cm abdominal aortic aneurysm. The abdominal great vessels were patent and no bleeding was evident. Because of persistent fever, guaiac-positive diarrhea and the development of abdominal pain, surgical consultants recommended abdominal exploration with the inten-

tion of repairing the aneurysm which was felt to be contributing to or causing the patient's illness. At operation, on the patient's third hospital day, an intact aortic aneurysm was removed and replaced with a prosthetic graft. No signs of bleeding or bowel ischemia were seen. The colon was noted to be erythematous, suggesting an inflammatory colitis. On the fourth hospital day the laboratory reported that stool cultures were growing *Shigella flexneri*. Administration of ampicillin, 1 gram intravenously every six hours, was begun and continued for five days. The patient's fever and diarrhea resolved and cultures of stool specimens obtained during and after therapy were negative for *Shigella*. The patient's postoperative course was uncomplicated and he was discharged on the 17th hospital day.

The *Shigella* strains isolated from this patient and from the other two patients were sensitive to ampicillin, cephalosporins, chloramphenicol and tetracycline by Kirby-Bauer disc susceptibility tests.

## Discussion

These cases illustrate several points that should be emphasized in the diagnosis and management of acute infectious diarrhea.

First, a careful history with emphasis on significant exposures is essential. Contact with similarly affected persons, particularly young children, should arouse suspicion of an infectious cause, especially *Shigella*. Recent foreign travel and exposure to crowded institutions should be discussed. Swimming in contaminated rivers is another recently recognized risk factor.<sup>4</sup> Inquiry should be made about water supply, recent food purchases and meals eaten at home or in restaurants. While most outbreaks result from spread from person to person, water and food, especially salads, have been implicated in sporadic cases and common source epidemics.<sup>5</sup> Interviews with our patients disclosed that two of them had eaten at the same restaurant 48 hours before onset of their illnesses. Both had eaten salads, which their unaffected dinner partners had not. The third patient had also dined out, an unusual event for him, two days before his illness and had eaten salad with his dinner.

Second, distinguishing shigellosis clinically from viral gastroenteritis is not always easy because of the wide variation in severity seen with both syndromes. However, fever, abdominal pain

and diarrhea with blood or pus in the stool should heighten one's suspicion of shigellosis.

Third, because patients' observations are unreliable predictors of the presence of red blood cells or leukocytes in their stool, a guaiac test and microscopic examination of stool should be done in all cases where diarrhea is an acute and clinically significant problem. Fecal leukocytes are seen with regularity in symptomatic shigellosis and their presence, though not entirely specific, should suggest an invasive process which is not characteristic of toxigenic or nonbacterial gastroenteritis.<sup>6</sup> Blood in the stool is detected in up to 50 percent of patients with shigellosis and may occur intermittently, as in case 1. Blood in the stool is not characteristic of viral gastroenteritis. Culture of freshly passed stool is the only way to make the diagnosis of shigellosis and several specimens should be submitted to increase the likelihood of a positive culture.<sup>7</sup> Not all specimens will be positive, as indicated by case 1.

Fourth, in managing patients with diarrhea, drugs that interfere with intestinal motility probably should be avoided unless clinical or laboratory evidence weighs heavily against infection. It has been postulated that the hypermotility that accompanies infectious diarrhea is actually a salutary process which hastens recovery from these usually short, self-limited infections. DuPont and Hornick<sup>8</sup> have shown that in shigellosis the diphenoxylate hydrochloride with atropine sulfate medication actually prolonged the duration of diarrhea in patients treated with an antibiotic. In patients who received no antibiotic, the medication shortened the duration of diarrhea but fever persisted two to three times longer than in those who did not receive the drug. It is possible, therefore, that in case 2 fever or diarrhea, or both, may have been prolonged by this therapy.

The use of antibiotics in severe shigellosis is desirable and they appear to shorten<sup>9</sup> rather than prolong the carrier state, as they do in salmonellosis.<sup>10</sup> The choice of antibiotic depends in part on the species and antimicrobial susceptibilities of the strain isolated but the most frequent species isolated from endemic cases in the United States, *Shigella sonnei*, is generally susceptible to trimethoprim/sulfamethoxazole as is *Shigella flexneri*. The latter is also usually susceptible to ampicillin.<sup>11</sup>

Properly constituted therapy with orally given fluids can ameliorate the symptoms of fluid loss and electrolyte imbalance that accompany acute

infectious diarrhea. While most useful for toxigenic types of diarrhea, such therapy may make a critical difference in the need for hospital versus home management of patients with shigellosis.<sup>12</sup>

The diagnosis of shigellosis was ultimately established in the three cases described, but only after expensive hospital stays and, in one case, major abdominal operation. Admission to hospital may have been necessary for each of the patients because of the severity of their symptoms, but conceivably it could have been avoided or shortened by an earlier diagnosis. A rapid diagnostic test for shigellosis would be a welcome way of avoiding these problems, but until one is available, the diagnosis in sporadic cases depends on a careful history and physical examination and appropriate laboratory tests of stool specimens, and on the physician's perspicacity. An algorithm for the diagnosis of acute diarrhea has been published and may serve as a useful guide for physicians who see patients with this problem.<sup>13</sup>

The difficulty of diagnosing shigellosis in adults is not a new problem and has been discussed previously in a report that noted that in only nine of 30 patients was the disease diagnosed correctly on admission.<sup>14</sup> In that study, fever was present in 77 percent, blood in stool in 50 percent and a shift to the left in the differential leukocyte count in 100 percent. These findings in patients with diarrhea plus a positive methylene blue stain for fecal leukocytes suggest that shigellosis should rank quite high on a list of possible diagnoses.

#### REFERENCES

1. Johnson AC, Kroeger HH, Altman I, et al: The office practice of internists—III. Characteristics of patients. *JAMA* 193: 916-922, Sep 1965
2. Rosenberg ML, Weissman JB, Gangarosa EJ, et al: Shigellosis in the United States: Ten year review of nationwide surveillance, 1964-1973. *Am J Epidemiol* 104:543-551, May 1976
3. Nahmias AJ, Gomez-Barreto J, Kohl S, et al: Newer microbial agents in diarrhea. *Hosp Pract* 11:75-82, Mar 1976
4. Rosenberg ML, Hazlot KK, Schaefer J, et al: Shigellosis from swimming. *JAMA* 236:1849-1852, Oct 1976
5. Black RE, Craun GF, Blake PA: Epidemiology of common source outbreaks of shigellosis in the United States, 1961-1975. *Am J Epidemiol* 108:47-52, Jan 1978
6. Harris JC, DuPont HL, Lewis KR: Fecal leukocytes in diarrheal illness. *Ann Intern Med* 76:697-703, May 1972
7. Weissman JB: Infectious diarrhea: When should you start to worry. *Med Times* 105:63-70, Sep 1977
8. DuPont HL, Hornick RB: Adverse effect of Lomotil therapy in shigellosis. *JAMA* 226:1525-1528, Dec 1973
9. Haltalin KC, Kusmiesz HT, Hinton LV, et al: Treatment of acute diarrhea in outpatients. *Am J Dis Child* 124:554-561, Oct 1972
10. Aserkoff B, Bennett JV: Effect of antibiotic therapy in acute salmonellosis on the fecal excretion of salmonellae. *N Engl J Med* 281:636-640, Sep 1969
11. Rudoy RC: In vitro susceptibility of shigella strains to trimethoprim and sulfamethoxazole. *Antimicrob Agents Chemother* 5:439-443, May 1974
12. Gangarosa EJ: Recent developments in diarrheal diseases. *Postgrad Med* 62:113-117, Aug 1977
13. Satterwhite TK, DuPont HL: The patient with acute diarrhea—An algorithm for diagnosis. *JAMA* 236:2662-2664, Dec 1976
14. Barrett-Connor E: Shigellosis in the adult. *JAMA* 198:141-144, Nov 1966